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OIL WORLD

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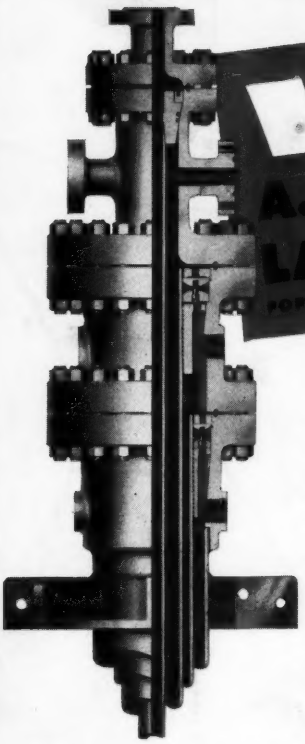

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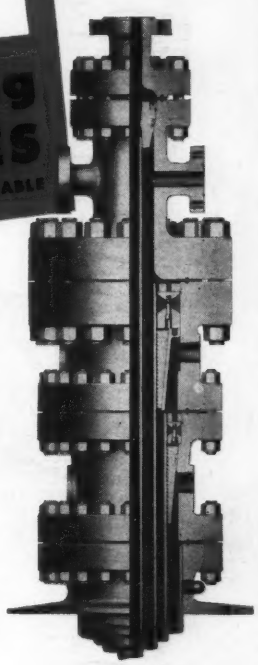

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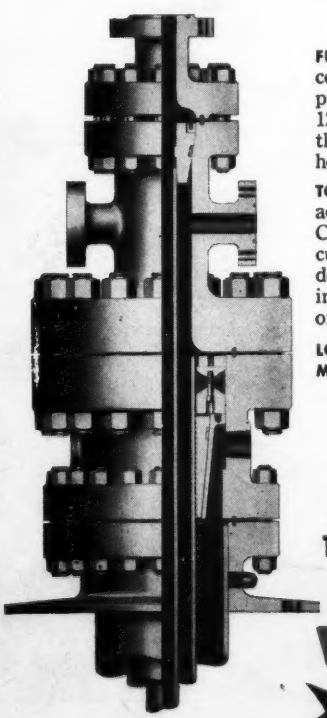
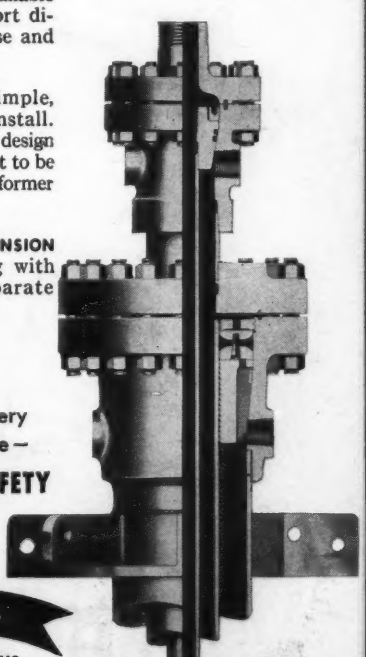


WILSON 10,000 lb. test, 2 string Full Opening API Landing Assembly



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CALIFORNIA

OIL WORLD

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FOR TIMELY, COMPLETE
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January 15th, 1947
Telephone Number TUcker 2571

Washington Highlights

Retroactive portal-to-portal pay suits, at this writing, have soared to a devastating sum, approximating $1,500,000,000. It represents back pay and damages asked of the nation's industries.

Seeking to curb the avalanche of suits, legislation has been introduced in both Chambers of Congress.

Two measures are pending in the Senate, introduced by Senators Wiley (Republican), Wisconsin, and Capehart (Republican), Indiana, as amendments to the Fair Labor Standards Act of 1938.

Representative Gwynne (Republican), Iowa, introduced a House measure limiting back pay claims to one year.

Under his proposal, employees could collect no more than one year's back pay on any suit now filed, and sets forth that in the future such suits would have to be filed within a year.

With amounts claimed in action already running into billions of dollars, Gwynne declared to the House that the entire philosophy of collective bargaining is being jeopardized.

"In view," he went on, "of the number of employees now subject to certain Federal statutes, the final amount may reach fantastic proportions and do serious damage to our entire economic structure."

Representative Knutson (Republican), Minnesota, chairman of the tax-writing ways and means committee, suggested a windfall tax, so to speak, on any back pay won by workers on portal suits. He added, however, that he is not now proposing such a move, but it is under discussion.

A labor weekly found in the portal suits an opportunity to take a slap at the C. I. O.

Labor, a newspaper of 15 railroad unions, most of which are A. F. L. affiliates, maintained the C. I. O. had seized upon the pay suit issue as a device for raiding rival unions. The weekly asserted the suits have further aroused Congress against labor.

The flood of back pay suits was born of a 5 to 2 decision of the Supreme Court in the case of the Mt. Clemens Pottery of Michigan. The Justice Department, through its Detroit representatives, has asked and has been granted permission to present its views in the court of Federal Judge Frank A. Picard, before Picard determines the amount of back pay employees of the pottery company should receive.

For the first time in 14 years, Republican Senators organized for their majority role in the new Eightieth Congress and chose Arthur H. Vandenberg, Michigan, to preside over the Senate, and serve as chairman of the foreign relations committee.

Senator Wallace White of Maine will serve as majority floor leader, and Senator Kenneth Wherry of Nebraska, as Republican party whip.

The first legislation introduced in the House in the new Congress was a bill by Representative Knutson, designed to cut taxes for 1947, H. R. 1 would reduce taxes by 20 per cent on incomes up to and slightly above $300,000 and 10½ per cent on amounts exceeding that figure. It also grants an additional $500 exemption for taxpayers more than 65 years of age.

Both the Senate and House have introduced bills to change the labor laws. A measure proposed in the House by Representative A. L. Miller (Republican), Nebraska, would establish a system of labor courts to settle disputes affecting public welfare. Representative Howard Smith (Democrat), Virginia, introduced a bill that would rewrite the Wagner act of 1935. Unions call the act "Labor's Magna Charta."

Senator William Knowland (Republican), California, is ready to introduce legislation that would definitely establish state ownership of the coastal tidelands of the country. A similar bill was offered in the last session of Congress, but came to naught because of the Chief Executive.

The attitude of the new Congress towards the measure is expected to assure overwhelming passage.

The Commerce Department's Office of Business Economics announced Americans spent a record $127,000,000,000 for goods and services in 1946. This was an average of more than $900 for every man, woman and child in the country. The total is $21,000,000,000 over last year's previous record.

His Majesty Abdul Aziz ibn Saud, king of Saudi Arabia, and (standing) his eldest son, Prince Saud.

Arabian Oil---A 20th Century Genie

By James Terry Duce*

All eyes in the petroleum industry are turned toward the oil concessions in and about the Persian Gulf. Here, as Everett L. de Golyer, noted geologist, expresses it, 150 wells have already indicated reserves of crude oil greater than the present proved crude reserves in the United States. We believe that as time passes, crude oil will be found here in volume sufficient to insure a supply of oil to the Eastern Hemisphere for generations to come. This, in turn, will relieve the strain on Western Hemisphere reserves which up to now have largely supplied the world.

In a recent article in the YALE REVIEW, Joseph E. Pogue, the well-known economist, indicates that total new reserves to be discovered in the Persian Gulf area may ultimately exceed 150,000,000,000 barrels. Approximately one-third of the prospective part of this area lies within the Saudi Arabian concession, now owned by the Arabian American Oil Company. On the other hand, this does not necessarily mean that one-third of these possible reserves will be found in Saudi Arabia, for like all other regions of the world, the Persian Gulf fields vary in richness from place to place.

Lloyd Hamilton Negotiates Concession

About the year 1910, geologists of the India Survey found a few small oil seeps on the Island of Bahrein. Because the great Tertiary oil horizons of Persia and Iraq had been eroded from the island, and because they knew of no commercial oil in the older beds, they concluded that the chances for oil were not great. Later, however, a British group secured a concession covering the island. This group, in turn, sold it to the Gulf Oil Company. Gulf offered the concession to the Iraq Petroleum Company group, who recommended that Gulf dispose of it, and it thus came into the hands of the Standard Oil Company of California.

As the CALIFORNIA OIL WORLD goes to press, international interest is focused on the announcement that negotiations are under way whereby two major American oil companies—Standard of New Jersey and Socony-Vacuum—may purchase interests in the Arabian-American Oil Company, and British crude oil produced in Iran by the Anglo-Iranian Oil Co., Ltd.

The latest report discloses that a preliminary agreement has been reached whereby the Arabian-American Oil Co. (Aramco), which owns exclusive rights to the Saudi-Arabian fields, will sell about 30 per cent of its holdings to Standard Oil of New Jersey. Socony Vacuum Oil Co. is expected to buy another 10 per cent. The Arabian-American Oil Co. is controlled by the Standard Oil Co. of California, and The Texas Company.

In the second venture, Standard of New Jersey and Socony Vacuum are reported to have agreed in principle with the Anglo-Iranian Oil Co., Ltd., to purchase crude oil produced in Iran by this British group. Such an arrangement would enable the American companies to supply Middle Eastern petroleum to European and Asiatic customers instead of U. S. oil.

Two oil pipelines may be built to connect the Persian Gulf with the Mediterranean. One line from Dhahran through the Levant countries will be operated by Arabian-American. The second, from Basra-Abadan to the Mediterranean, will be controlled by the Anglo-Iranian Co.

Standard sent E. A. Skinner to Bahrein and the first well was drilled at a site recommended by F. A. Davies, now president of the Arabian American Oil Company. This well proved that deeper horizons in the Persian Gulf would be productive. Looking out across the Gulf of Selwa from Bahrein Island, Skinner and Davies saw on the Arabian mainland the low dome of the Dammam field standing against the sunset, and recommended to their company the acquisition of concessions there. As a result, the Standard Oil Company of California sent to Saudi Arabia a remarkable man, the late Lloyd Hamilton, who in 1933 sat down with King Ibn Saud of Saudi Arabia and negotiated a concession for what is now one of the most prolific producing areas in the world.

The concession covers 450,000 square miles. From its northern boundary to the south is as far as from Canada to Houston. It has an average width equal to the distance from Wichita to Denver. Exploration has barely begun. Much of the southern part of the concession has never been visited by Americans.

Pipelines carry petroleum products from refinery at Ras Tanura to marine terminal.

A native line rider inspects the pipe line carrying Arabian crude from Abqaiq field to stabilizers at Dhahran. Arabian-Americans' field facilities are connected by a network of pipelines.

King Ibn Saud Approves Oil Search

The king later stated that he had been impressed by the efficiency of the Bahrein operation, and added that he was glad to make an agreement with a company which would not involve itself in the complicated politics of the Middle East but would carry out its commercial mission of exploring for and developing oil fields. The king was able to grant this concession because of the Treaty of Jidda, made with the British in 1927. This treaty recognized Ibn Saud's complete independence and supplanted an earlier convention which compelled him to make contracts only with companies approved by British authorities.

As soon as the contract was signed, the Standard Oil Company of California organized California Arabian Standard Oil Company, which later became the Arabian American Oil Company. Exploration began and drilling was started in 1935. The prolific producing horizons of Bahrein were discovered in 1936, but proved to be non-commercial in Saudi Arabia. Early reports of some of the company geologists were discouraging. The geologist in charge of exploration, Max Steineke, persisted, however, in the belief that deeper horizons existed. As a result, in 1938 the seventh well found prolific deeper zones. Later, Mr. Steineke and his geologists reported two additional areas of great promise, Abu Hadriyah and Abqaiq, where fields were opened in 1938 and 1942. Before this had taken place, however, The Texas Company, in 1936 had acquired a half-interest in both the Arabian and Bahrein concessions.

Four Great Fields Discovered

By the time of America's entry into the war, three major fields had been found in Saudi Arabia and by the end of the war the fourth field, Qatif, had been added. Of these fields we only know the boundary of one, Dammam, which covers approximately 10,000 acres. Abqaiq, some 40 miles to the south, is only in the early stages of its development, but has already been proved over some 30,000 acres. In 1944, de Golyer estimated Saudi Arabia's reserves at a minimum of 2,000,000,000 barrels, but this has been enlarged by later developments. Abu Hadriyah and Qatif are still one-well fields, but we know they are of considerable size. In addition, geologists report many other structures of great promise.

Obstacles and Dangers Plentiful

Such a bare recital does not give any indication of the difficulties and dangers surmounted by the personnel of the company in this tremendous operation. It must be remembered that at the time the concession was obtained, Arabia was almost terra incognita. Special permission had to be obtained to land on Arabian soil, and it was commonly believed that the local population would render a foreigner's life short and difficult.

During the years following World War I, a great change had come to Arabia. King Ibn Saud's conquest of all Saudi Arabia had quieted the tribal feuds which had torn the country, and this great statesman had adopted the policy leading to industrial development of his country. Nevertheless, when the early explorers, geologists, and production men landed in Arabia, they had to grow beards and wear Arabian clothes. The Arabs and the Americans, however, soon learned to trust one another, and no happier relationships now exist between a people and a company than between the Arabs and Aramco.

The climate of Arabia is severe. Winter temperatures may drop to freezing while minimum Summer temperatures are often over 90 degrees and sometimes run to 130 degrees at midday. The annual rainfall is only about three inches.

Difficulties were experienced with problems of water, health, and transportation. Fortunately, it was found that generally throughout the part of the country first explored, underground water supplies for ordinary purposes could be developed. The high Summer temperatures were combatted by the gradual introduction of air conditioning. Communication and transportation problems were solved by the development of special tires and equipment to enable wheeled vehicles to run over the sandy areas. These developments were of great value to the Army in planning its desert equipment during the war.

Drilling Problems Severe

Even oil drilling was subject to unusual difficulties because the section through which the drill was pushed consisted mainly of limestone. Some of these limestones contained cavernour zones with water under high pressure. All these problems were conquered. At the present time, production is being run from three fields: Dammam, Abqaiq, and Qatif. By December of this year, after completion of the present construction program, the company will be able to put 260,000 barrels a day through its Persian Gulf ports of Ras Tanura and Al Khobar. This capacity will be amply supported by productive wells.

During the war the company built, as a war project, the Ras Tanura refinery. This plant is unique in many ways. First, it was financed entirely by the parent companies without Government help; second, it was completed on time and within cost figures estimated; and third, it has operated at 190 per cent of rated capacity of 50,000 barrels a day, and has become the mainstay of our naval fuel oil supply in the Far East.

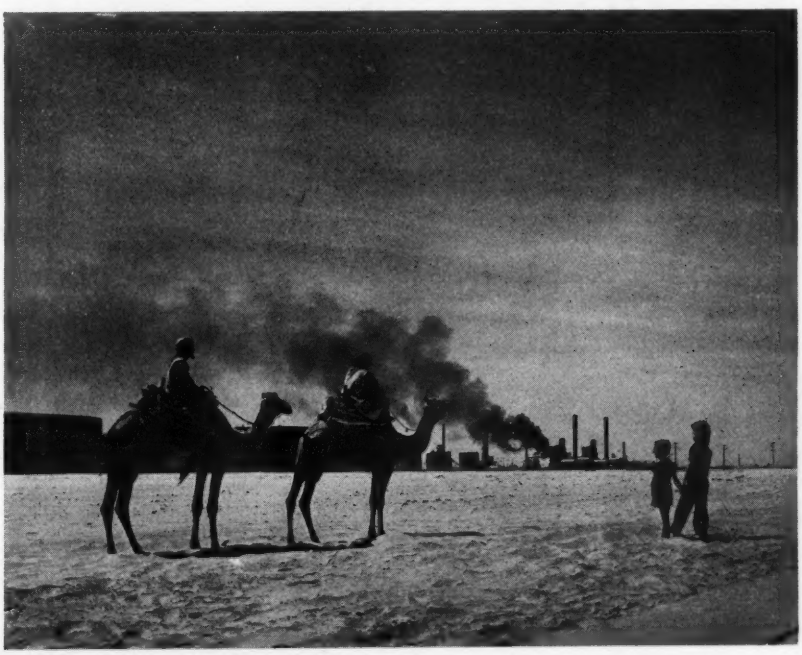
The growth of the company has been phenomenal. Two years ago it was producing 18,000 barrels a day. Today, that production has been multiplied by 10.

We have just begun. The future, I believe, will prove that the Arabian American Oil Company will be one of the greatest assets of The Texas Company, the Standard Oil Company of California, and last, but not least, of the Arabian government. At the same time, it will guarantee a fuel oil supply for the United States Navy abroad for many years to come, and will protect the American people against any possible future shortage.

Aerial view of Abqaiq field, scene of progressive drilling and development.

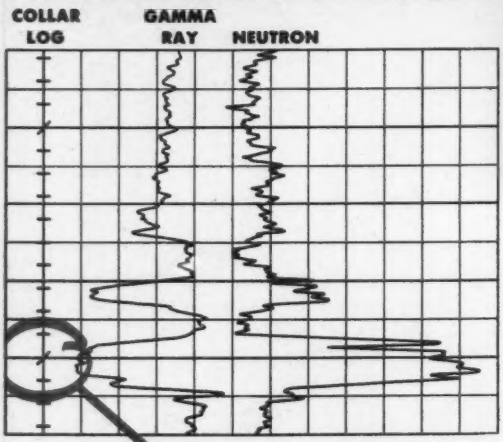
Published under the title ARAMCO CONCESSION in The Texaco Star, Vol. 33, No. 4, 1946. Reproduced with changes by permission.

*Vice president and Director, Arabian American Oil Company.



In Saudi Arabia the camel was and still is not only a means of transportation, but a source of food and shelter. Single-hump camels, noted for speed and endurance, are shown attracting youngsters near Ras Tanura refinery.

Right Combination for ACCURATE Gun Perforating



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The location of each collar is recorded electrically with Radioactivity Logging equipment, and each collar is shown on the Log in its fixed relation to the formation curves. The Collar Log is not charged for when run with a Radioactivity Well Log, but is furnished as an additional feature to provide Oil Well Operators with more useful information about their wells.

The reference collar nearest the shooting zone is picked up by the Collar Locator on the Gun Perforator. This combination permits accurate gun perforating at even the thinnest zones without dependence upon such questionable procedures as bottom checks or artificially placed formation markers.

For more details about these Lane-Wells Services consult your Composite Catalog—pages 1980-1993, or call your nearest Lane-Wells Branch.

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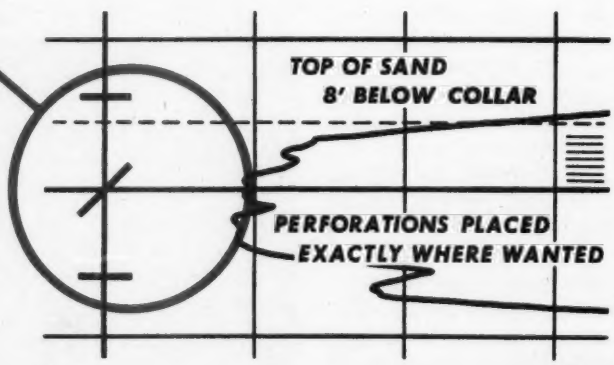
LANE-WELLS SYSTEM OF COLLAR LOCATION ELIMINATES MEASUREMENT VARIABLES

Lane-Wells Collar Log establishes the relationship between formations and collars. Each collar becomes an accurate bench mark for *all* subsequent well operations. Use of these bench marks means a saving of time and trouble for you in testing, plugback operations, squeeze cementing, acidising, and other completion practices utilizing gun perforating.



Tomorrow's Tools—Today!

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Saudi Arabia Strange Background for Oil

Many thousand years ago, in the ice age, when most of the northern hemisphere lay buried under immense glaciers Arabia was a fertile land. Three great rivers watered its plains and valleys. Grass and trees grew and flourished. Then, as the great polar ice cap retreated and the continents of Europe and North America woke to life again, Arabia slowly parched under a blazing sun and became a desert. The rivers dried up. The trees and grass vanished. The land became a dust bowl, then a mass of drifting sand and sun-baked earth one-third the size of the United States.

Birthplace of Mohammed and cradle of the Moslem faith, Arabia has known past glories, but for hundreds of years, until very recent times, it has remained remote, unknown, and isolated.

Most of its five and one-half million population have been the Bedouin—shepherds and camel herders who roamed the arid, hostile wastes in search of grazing for their flocks, wandering from one oasis to another in the wake of the scattered rains which produced short-lived patches of vegetation.

The People of the Camel

What little water there was existed only in primitive wells here and there in the desert and along the seacoast. Crude goatskin buckets, drawn by donkeys or camels, lift the precious fluid to the surface of the earth. Near these wells the Arabs built their early towns and by primitive irrigation methods have fought the scorching heat and the relentless sand.

Some towns have grown and prospered. Trade has flourished, for among the Arabs there have always been great merchants. The products of Arabia—spices, incense, pearls, and dates—were very important to the outside world. Arabia Felix, as it was known to the ancients, was the land of frankincense and myrrh. But for townspeople and Bedouin alike, life was hard and dangerous.

To the Bedouin, the camel was and still is not only a means of transportation, but a source of food and shelter. On the long journeys from oasis to oasis, the Arab can live for days on a diet of dates and camel milk. He wears the wool of the camel for clothing, lives in tents woven of camel hair, eats the camel's meat and lacking firewood, burns its dung for fuel. The Arabs call themselves "the people of the camel."

Arabian Life Stern

But in this strange and arid land grew a wonderful culture, the culture of hospitality. No one who claims his rights as a guest is ever turned away, and an Arab will give his last scrap of food to make a stranger welcome.

Crops, judged by modern standards, were pitifully small. Hunger was no stranger to the Arabs. Wheat has been grown wherever the limited water supply permitted. Even today, in most parts of the country, a few neighbors get together and reap the harvest just as their ancestors did ages ago.

The Arab is essentially good-humored in spite of his hard life. Even as he threshes the grain he does a little dance and sings a song.

He winnows the grain by letting the wind blow the chaff away, loads

Long dormant as a nation and spent by tribal wars, Saudi Arabia, under King Ibn Saud has joined the American petroleum industry to promote its great oil resources. Sands that for centuries have borne nomad trails are now drilled by native workers.

Old Portuguese Fort at Qatif on the Persian Gulf marks rule by Portuguese before Arabs expelled them in 1698.

his patient donkey with the fruits of his toil, then faces toward Mecca and prays to the Giver of all harvests, the compassionate, the merciful.

Religion is not worn like a cloak in the Arab lands. It is a vital part of every good Moslem's life. Mohammed united the Arabs, purified their customs, bound them into one people, and filled them with a great faith. Five times a day even the humblest Arab stops his work, faces Mecca, and intones the sacred words of the Koran: "There is no God but Allah, and Mohammed is His Prophet."

King Ibn Saud Unifies Arabia

Seat of temporal power in Arabia today is the capital city of Riyadh, deep in the Nejd country, on the central Arabian plateau. There lives His Majesty Abdul Aziz ibn Saud, King of Saudi Arabia, defender of the faith of his fathers and his mighty ancestors, whose proud lineage goes back through centuries of Arab history.

Ibn Saud was born in 1880 in Riyadh, but spent his boyhood partly in the sandy wastes of the Rub al Khali (the Empty Quarter) in southern Arabia, and in Kuwait on the Persian Gulf. Even as a youth he felt that his mission in life was to reunite his people and put a stop to the ceaseless warring between tribes. A great fighter and a great leader, he conquered first the Nejd, Arabia's heartland, then pressed eastward to drive the Turks from the shores of the Persian Gulf, and finally went west to take the Hejaz, including the holy cities of Mecca and Medina. His country is a charter member of the United Nations, and his is a powerful and respected voice in the councils of the Arab world. Arabia's renaissance dates from the founding of Ibn Saud's regime.

Modernization of Desert Empire

During the lifetime of Ibn Saud, many new things have come into Arabian life. True, only a start has been made. Camel caravans still ply between the ancient cities, hauling cargoes, and a man's wealth is still reckoned by the number of camels he owns.

But today a new traveler is seen crossing the desert—a metal serpent, twisting and turning over the sand and dunes—the oil pipe line. Modern motor trucks now travel the caravan routes and the ancient pilgrim trails over the rose-colored sands of the Dahana. For Saudi Arabia, barren of natural resources to the outward eye, has been blessed by Nature beyond the wildest dreams of those who raided and struggled for life across her sandy, wind-swept wastes.

Enormous quantities of petroleum have been formed thousands of feet below the earth's surface.

The presence of oil had long been

(Continued on Page 32)

The land composing Saudi Arabia, is a mass of drifting sand and sun-baked earth one-third the size of the U. S. A.

Steel for Tomorrow's Oil

By H. M. COOLEY
Assistant Metallurgical Engineer
Bethlehem Steel Company
Tulsa, Oklahoma

Introduction

Tomorrow's oil, we are told, will be oil from much greater depths than those from which today's oil is obtained. The first oil was skimmed from the surface of streams or strained from saturated earth where seepages occurred. Slowly oil became more valuable, first to rub on aching bones, later to turn the darkness of night into a flickering semblance of day, and finally to move people and materials swiftly across the face of the earth with barely any physical effort other than that required to press a button or turn a key. When the surface seepages no longer supplied the needed oil, the Drake well at a depth of a few hundreds of feet was followed by wells a thousand feet, then 5000 feet, then 10,000, then 15,000. Today wells have been drilled below 16,000 feet in search of oil and it is freely predicted that the oil of the future will come from 20,000 feet. It will be the ambitious purpose of this paper to take a look at 20,000 feet, to see what pressures and stresses may be encountered at that depth and to see what the metallurgical literature says about steels to resist those pressures and stresses.

It is believed that an interesting approach will be to follow the progress of the drilling operations in proper sequence, discussing each of the operations in terms of steel properties. Many of the operations will present few problems in addition to the present ones. These will be passed over swiftly. Others can easily be handled in terms of simple increases in cross section with or without small increases in physical properties of steel. These will be discussed briefly. Still others will have to be scrutinized closely, especially where pressures and stresses approach the limits of the presently available steels. Probably the greatest departure from conventional practices will involve casing and wire rope. Mechanical design work is already well under way on derricks, draw works, and pumps for 20,000 foot operations.

Rigging Up

Before drilling the well from which Tomorrow's Oil will come, pits must be dug and foundations poured. The pits will be larger and the foundations heavier, but no steel problem is expected in these operations other than possibly a little greater use of reinforcing bars.

The derrick, on the other hand, will have to carry more weight and will therefore have to be stronger. However, the problem need be obviously no greater than that of using heavier steel sections in the structural members, and perhaps greater heights to accommodate longer stands of drill pipe.

Crown and traveling blocks, sheaves, hooks, swivels, rotary tables, shafts, drums, gears will present mechanical design problems of a not unwieldy nature and present steels will undoubtedly serve adequately.

Wire Lines

Wire Lines for oil wells 20,000 feet deep! Why not; the wire rope manufacturers have met successfully many challenges to their ingenuity, not the least of which are:

- Hoist lines, up to 2⅜" diameter, for 35 yard bucket shovels.
- Boom guys of 4" diameter wire rope on huge shovels, replacing eye-bars.
- Draglines on 25 yard bucket excavators, using ropes as large as 3⅛" diameter.
- Shaft hoist ropes in metal mines with single lifts of 6000 feet.
- Coat mine shaft hoist ropes in coal mines operating at speeds up to 50 miles per hour.
- Wire ropes 2¾" diameter, a mile long, hauling loaded freight cars up an incline.
- Vertical lift bridges with 2000-ton moving span hoisted vertically with wire ropes up to 2⅜" diameter.
- Cable tool drilling lines for depths in excess of 10,000 feet.

Considering these accomplishments, the approach to wire ropes for drilling wells of depths of 20,000 feet no longer seems impossible or impractical. Loads of the magnitude of 350 tons, although a formidable figure for a wire line, can undoubtedly be handled with intelligent design of hoisting equipment, that is, the drum, crown sheaves and block. The rotary line will likely be 1½" or 1⅝" diameter and will be made of tough specially drawn wire.

Economically, from the consideration of wire line service, much will depend upon the size of the drum and sheaves, the line would likely be reeved in 12 or 14 parts, drums will be larger, may be large enough to wind the rope in one layer, maybe a new type of traction drive will develop, crown and block sheaves should have a tread diameter of at least 36 times the rope diameter and the factor of safety on the rotary line should be not less than 3½ and preferably 4.

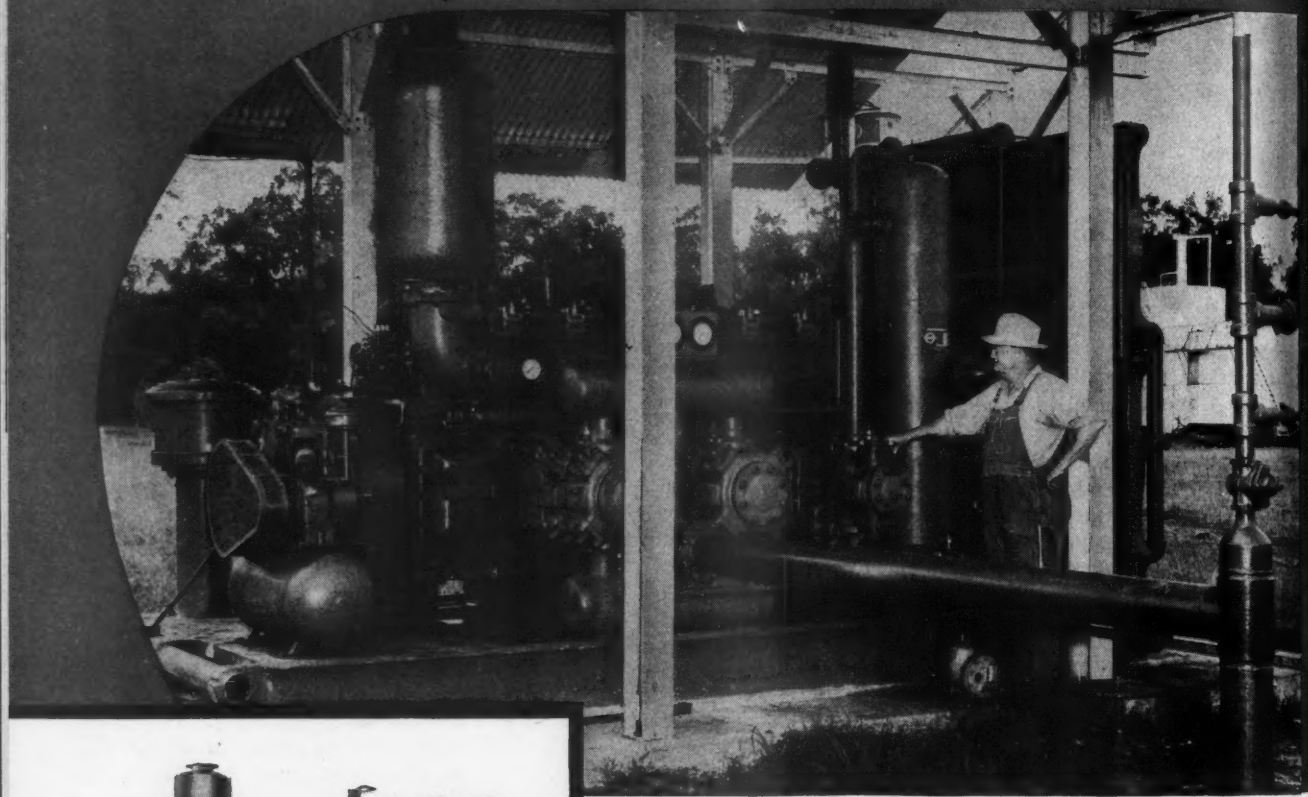
Drilling

Rock bits, drill collars and tool joints will present less of an increment to the present problems than will be the case with the light sections and great lengths of oil country tubular goods. Little additional stress will be encountered by the first two items over the stresses resulting from present drilling practices, and to some extent the third item will come in this classification. Rock bits, drill collars and tool joints lend themselves to methods of heat treatment that are not so easily adaptable to casing, tubing and drill pipe.

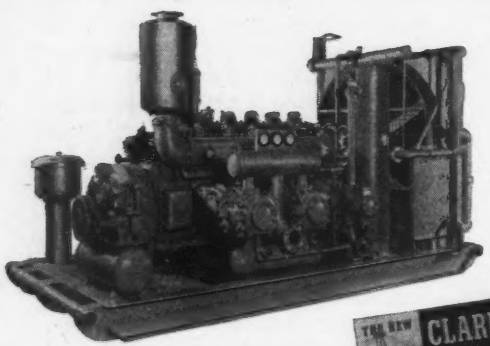
Drill pipe has not generally been considered adaptable to heat treatment processes involving quenching and drawing operations, although there is some possibility that quenching and drawing methods may be developed, particularly those employing air quenching. This will be discussed later under the heading of CASING AND TUBING. However, the problem of Drill Pipe will probably yield to a much simpler solution. Already 16,000 ft. wells have been drilled with the present Grades D and E drill pipe of 55,000 and 75,000 p.s.i. minimum yield strength, respectively. The steels which will be required to provide

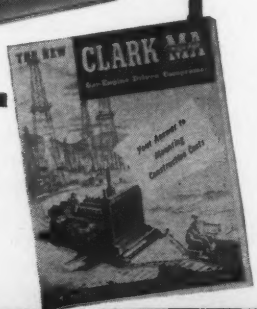
THE CLARK "MIDGET ANGLE"

a "Packaged" compressor station



Clark 6-cyl., 225 BHP "Midget Angle", skid-mounted, on gas lift service in the Hardin Field in Texas.





Send for a copy of this 20-page descriptive bulletin on the new Clark MA "Midget Angle" gas-engine-driven compressor.

● Here is an important new addition to the field of compressor equipment. It offers for the first time a complete compressor station that is semi-portable.

The Clark 2-Cycle "Midget Angle" engine-compressor unit combines light weight and portability with rugged strength. Its almost perfect balance and freedom from vibration results in smooth-running performance day in and day out, no matter how frequently the unit may be moved or where installed.

It is an ideal unit for small scale repressuring, temporary pipe line booster service, gas lift generator duty and other field services where costs must be kept down, or where the location is isolated and hard to reach.

CLARK

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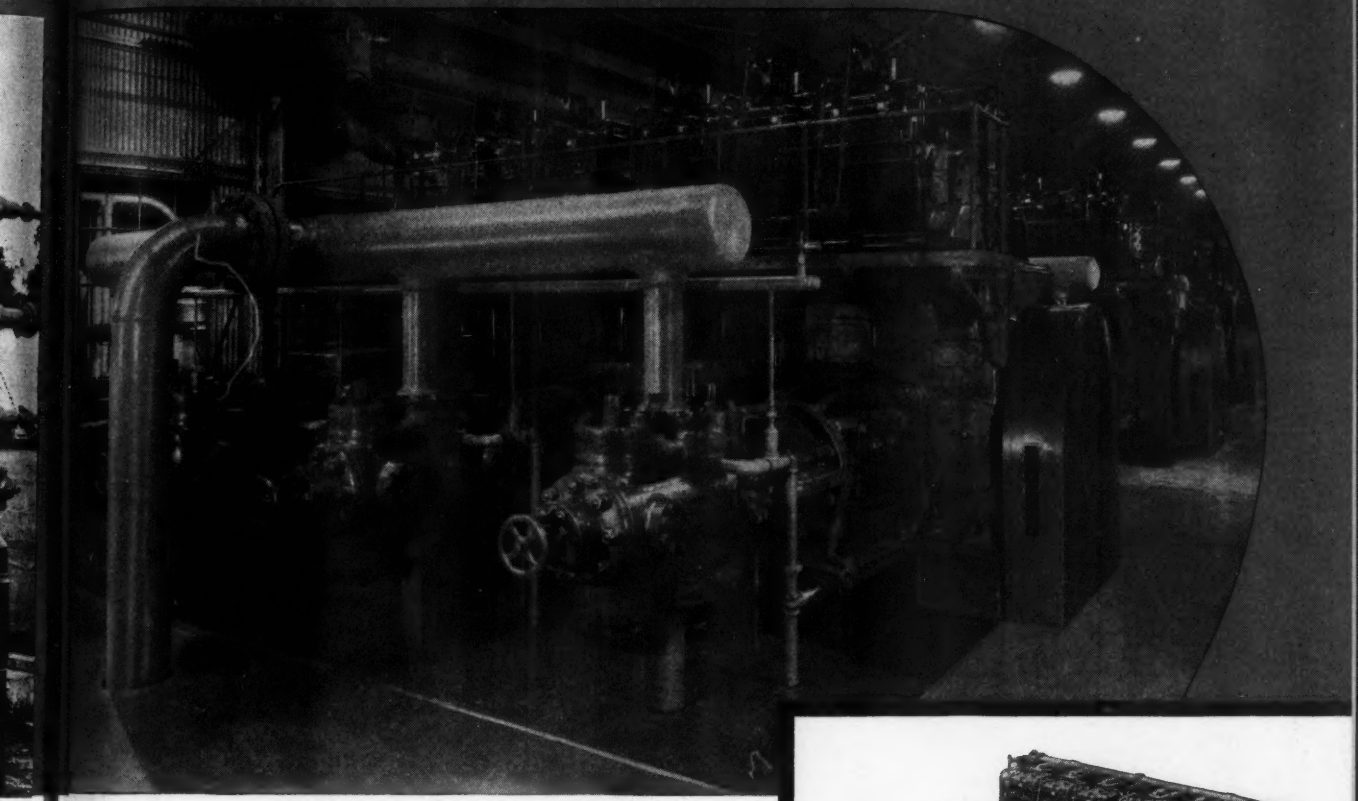
SETS THE PACE IN COMPRESSOR PROGRESS

THE CLARK "BIG ANGLE"

Most horsepower per unit of space



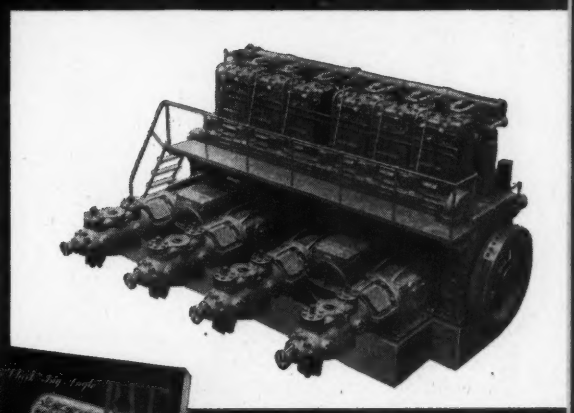
Clark 1200-BHP "Big Angle" Compressors in the Tennessee Gas and Transmission Pipe Line Company's station at Winchester, Ky.

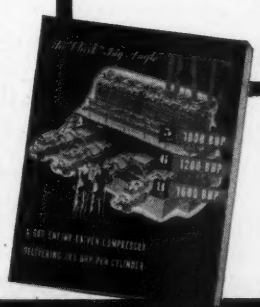
● This is the king of the heavy-duty compressor field, the new Clark BA-17 Right Angle Compressor.

The BA-17 represents the highest development of the long line of Clark 2-Cycle gas-engine-driven compressors. It was designed to fill the need for greater economy in high pressure pipe line pumping and large scale pressure maintenance.

It doubles the horsepower per cylinder previously available in gas-engine-driven compressors—200 BHP instead of 100 BHP—the most compact, heavy-duty compressor ever built.

This results in much lower foundation and building costs and lower maintenance costs.





For complete specifications and data on the BA-17, including typical installation design for modern pipe line station, ask for Catalog BA-17.

CLARK BROS. CO. INC., OLEAN, NEW YORK

adequate resistance to casing string stresses will probably not be needed in drill pipe strings. Even now, all of the properties in the present drill pipe grades are not required to withstand normal drilling stresses but rather to withstand handling methods such as the fast running in and out of the hole, the righ rotating speeds, and the cutting of the pipe by tongs, elevators and rotary table slip teeth.

It is quite likely that with careful handling the present Grade E could be used to drill the 20,000 feet. The tension load resulting from the weight of the string could be eased by tapering, either by using a heavier weight of the same size in the upper portion of the string, or by using a large size in the top section. The larger size method of tapering will also provide increased fluid flow area for the larger mud pumps already on the market. Of course drill pipe having higher strength than the 75,000 p.s.i. yield Grade E will be available if needed. It may be found that a combination of higher yield and tapering of the strings will provide the ultimate answer to any drill pipe problems.

Casing and Tubing

This discussion will deal largely with casing problems as it is not likely that tubing will require a separate solution. In casing design advantage cannot be taken of greater cross sectional area to withstand increased stresses because a point is reached where the greater weight of the string cannot be supported by the top section. Therefore, it is clear in the beginning that improved physical properties play an important part in making casing for tomorrow's oil well. On the other hand there is a limiting resistance to collapse for each size and weight of casing beyond which further increase in yield strength will not result in increase in collapse resistance. It seems, therefore, that a proper approach to the problem will be to select the smallest size commonly used for oil strings, 5½" OD, and the heaviest weight per foot now in common use, 23 lb., and then try to arrive at an estimate of the kind of steel of which this casing should be made.

Expected Pressures and Stresses at 20,000 Feet

Standard formulae disclose that a drilling mud with a density of 12 lbs. per gallon will exert a hydrostatic pressure of 12,500 p.s.i. at 20,000 feet. The API formula for determining the average yield strength required to resist this collapsing pressure is:

$$YP = \frac{P \times (D/t)^2}{2(D/t-1)} = \frac{12{,}500 \times 13.25^2}{2 \times 12.25} = 89{,}500 \text{ p.s.i.}$$

With a safety factor of 1.125, a 100,000 p.s.i. average yield strength steel is indicated. It is recognized that other safety factors, some as high as 1,500, are now in use, but there is already sufficient experience with deep wells to justify a suggestion that 1.125 may find wide acceptance as a proper collapse safety factor for depths of the order of 20,000 feet. Tension stresses in 20,000 foot casing strings calculate to about 68,000 p.s.i. A 1.4 safety factor, which a well designed strong joint might justify, indicates that a steel of 95,000 to 100,000 p.s.i. yield strength will be adequate.

Similarly, internal pressure calculations, using a pressure of 10,000 p.s.i. and a safety factor of 1.2, show that a steel of about 91,000 p.s.i. yield strength will serve. Therefore, theoretically, under the above conditions it is believed 100,000 p.s.i. yield strength steel will resist external collapsing pressures, longitudinal tension stresses and internal pressures that might ordinarily be encountered in approaching 20,000 ft. depths. However, it is recognized that there may be times in drilling to 20,000 ft. when we might encounter abnormal sub-surface pressures which may necessitate a re-examination of the currently used safety factors.

Properties of Steel

The development of casing and tubing possessing the proper physical strength for good performance in deep wells will present an interesting problem. There is a wealth of experience and information in the utilization of both carbon and alloy steels, including the emergency triple alloy steels which proved so useful during the recent World War. Quenched and drawn carbon steels may not quite meet all the requirements involved in the manufacture and use of the casing even though a yield strength of in the neighborhood of 95,000 p.s.i. may be obtained from SAE-1040 steel that has been properly heat treated by quenching and drawing. In this type of heat treatment the quench medium required to obtain such a high yield strength would of necessity be either oil or water, and such practice does not well lend itself to tubular lengths of 30 and 40 ft. The same difficulty would be encountered in attempting to liquid quench and draw casing made of medium manganese steel. As suggested in the section on DRILL PIPE, air quenching from a temperature above the critical range is being applied to tubular products with excellent results. However, air quenching of itself will not produce sufficiently high yield strengths in the plain carbon steels to serve our purpose in casing for these very deep wells. SAE-1040 Steel barely reaches 60,000 p.s.i., and .33 carbon—1.20 manganese steel produces a little over 60,000 pounds. While it is thus obvious that the solution of this problem cannot be readily answered by ordinary common steels and the conventional manufacturing practices, it is well within the realm of possibility that the desired yield strength of in the neighborhood of 100,000 p.s.i. can be obtained by introducing new methods and new materials. It is believed that high yield strengths in both tension and compression and in both the circumferential and longitudinal directions can be expected from several of the well known types of steels properly processed with this specific application in mind.

The foregoing approach to determining the physical properties needed is purposely general in character. This discussion is intended only to suggest the first steps in planning the metallurgical and design studies which must be carried on in more detail before a new steel is presented for a problem so challenging as that of providing adequate steel for tapping the deep hidden reserves.

Spang-Chalfant Develops New Corrosive Resistant Pipe

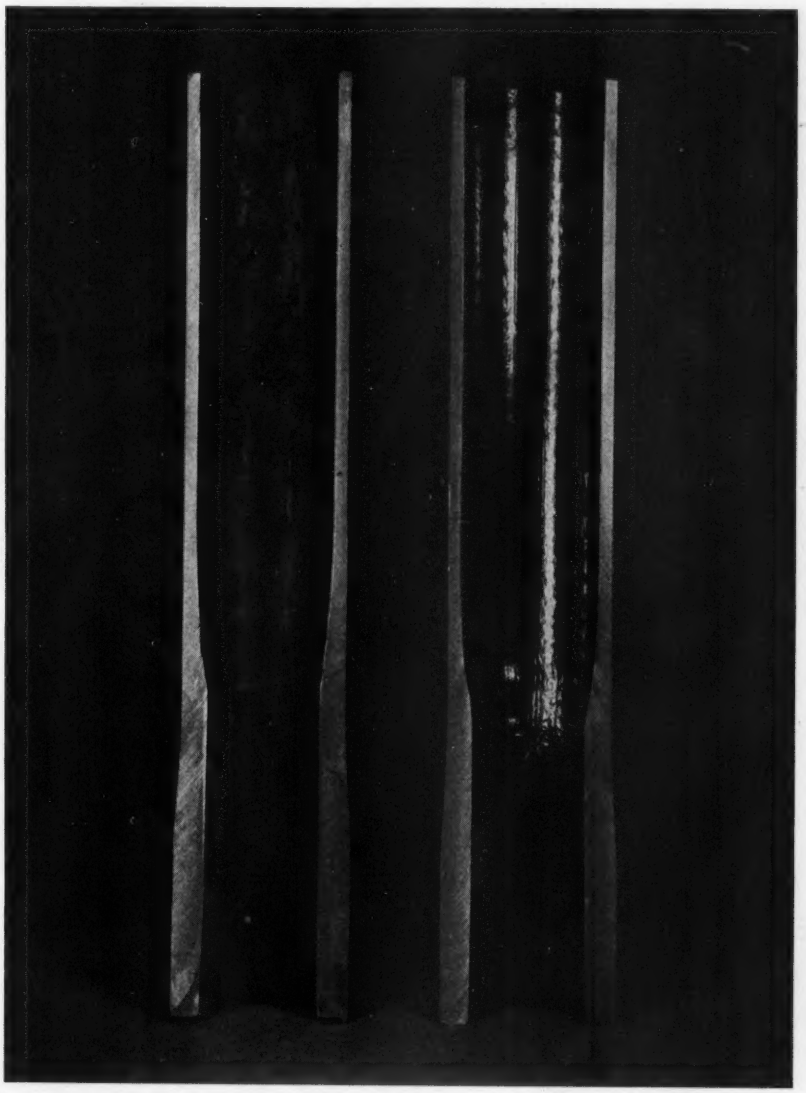
Development of plastic-coated steel pipe resistant ot the corrosive conditions often encountered in oil-well drilling has just been announced by the Spang-Chalfant Division of The National Supply Company, of Pittsburgh, one of the world's largest manufacturers of pipe. Unique properties of plastic-coated pipe promise to open broad fields for its use in many other industries, including home and industrial construction. Spang-Chalfant is continuing its research along these lines.

During field tests of the new plastic-coated drill pipe which were performed intermittently over the last few years, several oil wells were drilled with a total of more than sixty thousand feet of hole. These tests have proved conclusively that plastic coating will prevent many failures of pipe during drilling by protection of the surface against corrosion pitting.

The research and experimental work which resulted in this development has been progressing for several years at the Research Laboratories of the Spang-Chalfant Division, according to Dr. L. E. Trishman, Chief Research Engineer. More developments are expected to be brought out in the near future.

"Corrosion pits or any other surface notches act as stress raisers in rotating or highly-stressed machine parts," Dr. Trishman explained in announcing the new pipe. "These pits develop into cracks, sometimes t osuch a degree that the stressed member fails before the crack is discovered. Cracks which develop from corrosion pits and in a corrosive environment are known as corrosion fatigue cracks. Plastic coating protects the metal against the formation of the corrosion pitting, thereby preventing the development of corrosion fatigue cracking.

"The importance of preventing corrosion fatigue cracking of oil-well drill pipe can be realized when it is considered that a cracked length of pipe might let several thousand feet of pipe drop in the hole and



Half-sections of 4½ inch outside-diameter drill pipe made by the Spang-Chalfant Division of The National Supply Company, Pittsburgh, Pennsylvania. The section on the left shows the inside surface of the pipe as it comes from the mill while the one on the right is inside-coated with a baked-on plastic. The plastic coating, said to be one of the most important developments in the oil well drilling industry in recent years, protects the pipe against corrosion while drilling wells in highly corrosive fields. Spang-Chalfant, which also manufacturers pipe for industrial and home use, is continuing its research to develop the coating process for pipe used in many industries other than the oil fields.

Here's the Answer to CASING SHORTAGE!

Protect your *Casing* against drill pipe wear with Patterson-Ballagh Casing Protectors *and you can use it over again!*

CASE HISTORY NO. 21
(A typical case)

We hope you have Casing in abandoned wells that were drilled with a string *100% protected* by Patterson-Ballagh Casing Protectors. Pull it and use it again, for it may prevent a shut-down due to shortage of critical casing sizes. This Case History is one of many which proves the value of Casing Protectors, not only for salvage, but for a SAFE WELL. Let your Patterson-Ballagh man demonstrate the many other advantages of 100% Protection.

Many operators are now able to salvage casing from abandoned wells because they used Casing Protectors on their drill pipe while drilling them.

In Louisiana a prominent operator set 9400 feet of 9⅝" Casing and used a Patterson-Ballagh Casing Protector on every joint of 4" Drill Pipe inside the Casing. *This gave him 100% protection.* After drilling inside this Casing for four months, a well failed to develop, and a large part of the Casing was pulled. It was then Tuboscoped and Magnafluxed, and all but two joints were found to be O.K. to run again. These two joints had bit marks inside the Casing. All the other joints were re-run in an 8000 ft. string in another well where drilling was planned to bottom at 12,500 ft., using a string of fully rubbered drill pipe.

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cause a very expensive fishing job to recover it and the drilling tools, or such an accident might cause the abandonment of drilling the well when near completion because the "stuck" pipe cannot be fished out. One severe corrosion fatigue crack could therefore cause the loss of a valuable well or perhaps more than half a million dollars spent in drilling it.

"The Permian Basin oil field of West Texas is considered by the industry as the 'hot spot' of all American oil fields. Huge, thick salt beds are encountered several thousand feet down in the earth in this area. In drilling through this salt, the drilling mud that is forced down through the drill pipe to lubricate the bit and also wash the cuttings to the surface, dissolves some of this salt and becomes a strong corrosive solution which attacks the pipe severely. Literally thousands of corrosion pits develop in only one 30-foot length of unprotected pipe. It is obvious that in time, as more and more stress cycles are applied to the drill pipe during rotation, some of the pits will develop into serious corrosion fatigue cracks.

"Until about 1940, little or nothing was done about trying to overcome this hazard. In fact, few in the field recognized what caused the failures. At this time the Spang-Chalfant Research Laboratories started to study the problem and look for a solution. Two methods of attack were found. One was to add a chemical to the drilling mud to stop the attack of the corrosive substances dissolved in the mud in drilling through the various formation in the earth. The other was to cover the pipe with some inert material to protect it against corrosive substances.

"The attempt to combat this corrosion and thus fatigue failures by treating the mud chemically to counteract the corrosive chemicals it picked up as it traveled the length of the hole was partially successful, but drill pipe protected in this way was satisfactory only for the particular well being drilled, whereas protection of the pipe for all of its useful life was desired.

"Stainless steel did not have great enough tensile strength and besides was too expensive, so it was logical to try to find a coating for the steel drill pipe. This presented two major problems—finding a coating that would take the punishment and at the some time could be applied to 30-foot lengths of pipe.

"The coating had to be impervious to oil and water, resist comparatively mild chemical attack and remain chemically stable itself. It had to withstand temperatures as high as 400° F., resist mild abrasion and not become brittle or flake off. Neither could it change the physical properties of the surface of the pipe. The most difficult problem was finding a coating that could be applied to the inside of long lengths of pipe and that would adhere to the surface. A method of coating the pipe had to be found that would not leave pin holes or fine cracks in the coating for these in themselves would act as good starting places for corrosion pitting which eventually would result in fatigue failures.

"Research and experiments continued until, in 1942, two experimental strings of pipe coated with an air-drying phenolic plastic were produced. These strings were put to work drilling wells in a hot spot area, and while there were no corrosion fatigue failures it was found that the coating eventually scaled off in large patches and the surface became pitted and corroded. In the meantime, work continued, although retarded by war experimental work, and a thermosetting plastic was found that laboratory tests showed might be the answer.

"Late in 1945, four strings of the coated pipe were made up and shipped to four drilling companies for field trial in the worst hot spots of an area where corrosion fatigues were prevalent. These strings were made up of alternate lengths of coated pipe and uncoated pipe.

"These strings have drilled a total of 62,181 feet without a single corrosion fatigue failure in the coated pipe, while there have been 14 failures in the uncoated pipe, most of them proved directly due to corrosion fatigue.

"One string has drilled 29,000 feet of hole with eleven failures in the uncoated pipe, most of them due to corrosion fatigue, while there were none due to that cause in the coated pipe. Laboratory examination of samples of the coated pipe showed that the coating still was intact and in good condition after drilling the above footage. The coating was stripped off the samples and the steel underneath was found to be completely free of any corrosion pits or cracks. The uncoated pipe was badly pitted and contained many small corrosion fatigue cracks.

"The second of the strings has drilled 24,000 feet of hole, and while three corrosion fatigue failures developed in the uncoated pipe there were none in the coated.

"No failures, either in the coated or uncoated pipe, have been reported in the third string that has drilled only 9-181 feet of hole to date. The fourth string has not yet been put in use.

"Not all failures result in a 'fishing' job because usually the weakened pipe is discovered before it completely fractures.

"From these field tests, and from those in our laboratory on fatigue-testing machines, Spang-Chalfant believes it has found the answer to the problem of corrosion fatigue."

The new pipe already is in production at the Spang-Chalfant Division's plant at Ambridge, Pennsylvania. Drill pipe, the majority of it 4½ inches in diameter, first is shot-blasted on the inside. The pipe then is upended in a rack and the liquid plastic is forced up the inside of the pipe until it has reached the top. Then it is drained slowly so that no air bells or streaks are formed. After a short drying period at normal temperature, the pipe is placed in an oven and the plastic coating is baked on. Four successive coatings of the plastic are baked on the pipe.

Only the inside of the pipe is coated for oil-well drilling because it has been found that almost all corrosion fatigue failures develop only from the inside. This is because the pipe turning in the hole keeps its outside surface burnished by rubbing against the wall of the hole. For most other applications the pipe probably would need to be coated on both the inside and outside surfaces.

Personalities IN THE NEWS

J. R. Fluor

Fluor Names Two New Directors

T. H. "Ted" Seavey, manager of purchases, and J. R. "Bob" Fluor, manager of manufacturing, have been appointed directors of The Fluor Corporation, Ltd. Seavey has been with the firm since 1931, and Fluor, who was an Army Air Force pilot during the war, rejoined the company last June.

T. H. Seavey

Ross Nichols, geologist and engineer for Bolsa Chica Oil Corp., is on a tour of company properties in the Jacalitos and Santa Maria fields.

James Hamilton (Jim) Macklin, who recently passed away, was once a member of the Huntington Beach City Council and co-discoverer of oil in the beach city. A native of Ireland, Jim was one of the best known oil men in California and until a few years ago was actively identified with oil development.

Harry H. Mack, vice president for Sunray Oil Corp. at headquarters in Tulsa, Okla., has been transferred to Los Angeles. He will supervise the company's California producing and exploratory operations.

William E. Monahan, for more than 19 years with Shell Oil Co. in the gauging and engineering department at the Wilmington refinery, has retired. A native of Danville, Illinois, he worked for the city of Long Beach and Union Pacific Railroad before joining Shell in 1927.

The late Captain Robert W. Callaway, a member of General Petroleum Corp.'s laboratory department as a chemist before entering military service in August, 1940, has been posthumously awarded the Silver Star and the Oak Leaf Cluster to the Silver Star at an informal ceremony at Fort MacArthur. He is a nephew of Wesley Cunningham, General Petroleum comptroller.

"Laboratory Investigations for Production Engineering" was the topic discussed by W. Tempelear-Lietz, chief reservoir engineer for Shell Oil Co., at the meeting of the geological forum, American Association of Petroleum Geologists. The meeting was held in the Shell conference room in the company's Los Angeles building.

Langley Appointed by McCullough Tool As Export Representative

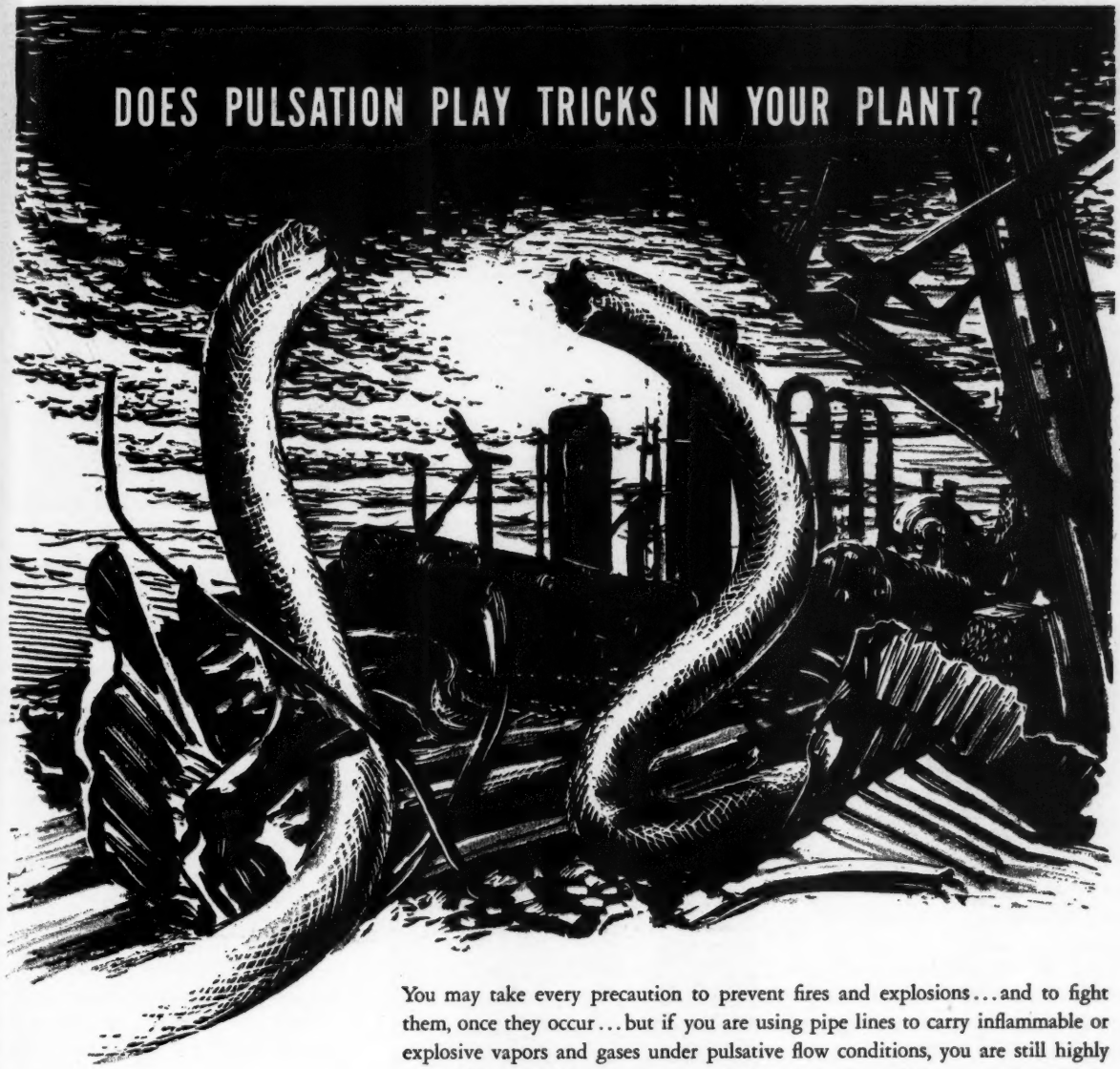
Announcement has been made by Mr. Harry E. Hester, Export Manager of the McCullough Tool Company, of the appointment of Mr. Kenneth J. Langley as exclusive representative for the sale of McCullough products for Argentina, Brazil, Paraguay, Bolivia, Uruguay and Chili.

Mr. Langley has had many years of oil field experience and recently has been associated with one of the large oil publications in the capacity of Eastern Manager, making surveys of several of the South American countries. Mr. Langley is, at present, in New York and expects to leave shortly for Buenos Aires, Argentina where he will make his headquarters.

Fred Hough, executive engineer for the Southern Counties Gas Co. in Los Angeles, was the chief speaker at the regular monthly meeting of the Santa Maria Oil and Gas Association at Santa Maria. His topic was "Texas Gas for California."

D. E. Carr, Union Oil Co., and C. R. Ramey, Standard of California, are among those appointed by the American Petroleum Institute to sectional committee Z-11 of the American Standards Association.

Stark Fox, public relations chief for the Oil Producers Agency of California in Los Angeles, is in Sacramento, where he plans to stay for several weeks watching the legislative mills grind.



You may take every precaution to prevent fires and explosions... and to fight them, once they occur... but if you are using pipe lines to carry inflammable or explosive vapors and gases under pulsative flow conditions, you are still highly vulnerable. Pulsative flow sets up vibrational stresses which eventually result in metal fatigue and breakage of pipe or fittings... even though the amount or extent of the vibration is not visible or audible.

You can prevent this insidious source of danger by stopping pulsative flow before it can start line vibration. The FLUOR Pulsation Dampener is the answer. It converts pulsative flow in gas, air or vapor lines to smooth, steady flow. It stops vibration because it eliminates its cause. Once installed, results are permanent.

The FLUOR Pulsation Dampener has no moving parts. It reduces friction losses, increases rate of flow and effects substantial horsepower savings. It requires no maintenance attention or expense. If vibration plays tricks in your plant, it may be due to pulsative flow in gas, air or vapor lines. In that case, the FLUOR Pulsation Dampener is a sure cure. Write for Bulletin PD-1.

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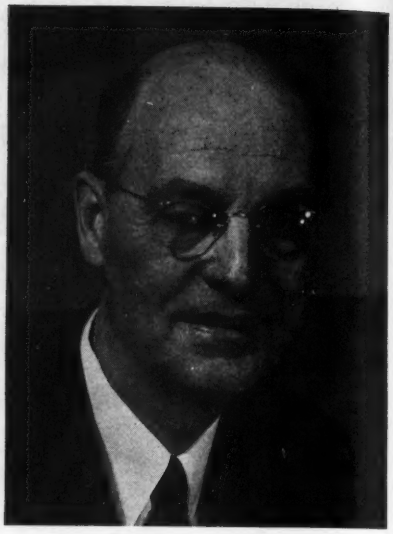

D. K. Hutchcraft

Clark Bros. Co., Inc., Adds To Its Official Family

At a recent meeting of the Board of Directors of Clark Bros. Co., Inc., the following members were added to the present roster of its official family.

F. H. Light, Vice President, Treasurer and Secretary.

J. N. MacKendrick, Vice President in charge of Engineering.

D. K. Hutchcraft, Vice President in charge of Sales.

F. W. Laverty, General Sales Manager.

F. H. Light has been with the company for 35 years, during which he has served consecutively as Purchasing Agent, Treasurer and Secretary and now as Vice President, Treasurer and Secretary.

D. K. Hutchcraft first joined the company in 1926, as a salesman, later becoming Mid Continent Sales Manager which office he held until 1945 when he became General Sales Manager in charges of Sales.

F. W. Laverty

J. N. MacKendrick came to Clark Bros. in 1929 as Engine Designer and served in that capacity for the next seven years when he succeeded C. Paul Clark as Chief Engineer. By the recent election, he becomes Vice President in charge of Engineering.

F. W. Laverty, entered Clark service in the foundry, in 1927. Thereafter, he served successively as Test and Development Engineer, Advertising Manager, Technical Service Manager, Technical Sales Manager, Assistant General Sales Manager succeeding to General Sales Manager in the recent election.

No personnel change was made in the balance of the company's officers.

William J. (Bill) Kemnitzer, internationally known oil geologist, has completed a vacation in Los Angeles and returned to Bolivia, where he has made his home for the past four years. His work in that country is centered on aiding the Bolivian Government in an oil development program. He has been cited for meritorious service.

Before going to South America, Kemnitzer maintained a California residence at Laguna Beach, and was identified actively with a number of California oil concerns.

Lieut. Col. Herbert Freuler, a former research man for Union Oil at Oleum, was held prisoner by the Japanese for more than four years and liberated after V-J Day. Jewelry, taken from him when captured, was not returned upon his release.

According to the company's monthly bulletin, an American broadcaster in Tokyo recently asked his listeners if anyone in the United States knew the whereabouts of Herbert Freuler. He explained that jewelry marked with that name had been taken from a Japanese and was being held at Allied headquarters.

An answer was not long in reaching Tokyo and the Colonel, now at Quantico, is once more in possession of his valuables.

The Agency Date Book, compiled and published by the Oil Producers Agency of California, is off the press and has been distributed to members of the association and other interested parties. It was printed under the direction of Rush M. Blodget, executive vice president of the agency, and edited by Stark Fox, in charge of public relations. What happened, who did it, and when, from the Mexican period to 1947, is clearly revealed in the book.

THIS

LAUGH

OFF!!

Visitor: "Do any of your close friends ever visit you?"

Prisoner: "No, lady. They're all here with me."

A woman called up for jury duty refused to serve because she didn't believe in capital punishment.

Trying to persuade her, the judge explained: "This is merely a case where a wife is suing her husband because she gave him a thousand dollars to pay down on a fur coat and he lost the money in a poker game."

"I'll serve," she said. "I could be wrong about capital punishment."

A woman traveling by train was talking with a man in the next seat. In describing her holiday she said that she had visited San Jose.

"You pronounce that wrong," said the man. "It's San Hosay. In California you pronounce all the J's as H's. When were you there?"

The woman thought for a moment, then answered, "In Hune and Huly."

The young Swedish couple were applying for a marriage license. They happened to have the same family name.

"Name?" asked the clerk.

"Gus Yohnson."

"Your name?" hJe asked, turning to the girl.

"Olga Yohnson."

"Any connection?" asked the friendly clerk.

Both colored up and gulped a bit and finally Gus answered, manfully, "Yah, twice."

"Do you know, Mary, if my dressmaker's bill came while I was out?"

"I don't think so, ma'am, I can hear your husband singing."

A young reporter was told by his editor to never use two words when one would do. He took the editor at his word in reporting a fatal accident as follows: "Joe Dokes struck a match to see if there was any gas in the tank. There was. Age 59."

A mountaineer found a mirror. "Well, well, if it ain't a pitchcer of my old pappy," said he, and took the mirror home and sneaked it into the attic.

But his wife was suspicious and that night while he slept she slipped up to the attic and found the mirror. "So that's the old hag he's been a-chasin'."

"What happened to the little girl who went to the big city wearing those awful cotton stockings?"

"Nothing."

We're getting terribly tired of driving a car that's paid for.

Housewife: And are you really content to spend your life walking about the country, begging?

Hobo: No, lady, not at all. Many's the time I wished I had a car.

Father: "Sonny, I'm going to tell you a story."

Four-year-old: "Okay, but keep it clean. The old lady may be listening."

"That's a good-looking hat you're wearing."

"Yes, I bought it five years ago, had it cleaned three times, changed it twice in restaurants, and it's still as good as new."

Romeo: Since I've met you I can't eat, drink, play or sleep.

Lorelei: Why not?

Romeo: I'm broke!

Pastor: Good morning, May. I hear God has seen fit to send you two little twin brothers.

Little May: Yes, sir, and He knows where the money's coming from, too. Daddy said so.

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V-J DAY was a year and a half ago. Still—things are harder to get now than they were in the middle of the war.

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App Succeeds Parsons at G. P.

Of wide interest to the oil industry, particularly in the field of production, is the announcement from President S. J. Dickey of General Petroleum Corporation that B. E. Parsons, for many years Vice-President and Director of production of that company, has retired as of January 1, and that Max S. App, who has been manager of the production department, succeeds Parsons as the new Vice-President and Director of Production.

Max S. App

"Ben" Parsons, a Stanford graduate of the class 1910, spent the first two years of his business life as an assistant geolgist for the Southern Pacific Company, and came to General Petroleum in 1914 as a geologist. In 1918 he became superintendent of the company's operations at Taft, and since then has worked on through the department up to the position from which he has just retired. He is a member of the American Institute of Mining and Metallurgical Engineers, and has been a member of the American Petroleum Institute national committee on production. During the war he acted as a member of the PAW production committee for district No. 5, and for some time has been a member of the Western Oil & Gas Association and the Petroleum Production Pioneers. He is also a member of the Los Angeles Chamber of Commerce.

Mr. Parsons announces that he has no particular plans for the future, but that he definitely is not going to "go on the shelf" and intends to maintain an interest in the industry to which he has made so many important contributions.

Max App, who takes over the responsibilities vacated by Parsons, has been with General Petroleum since April of 1912 when he went to work as an engineer at Taft. Since then he has enjoyed a well-merited and steady progress through the ranks of the production department and his excellent record of achievement explains his promotion to his new position. He has contributed to API and other industry activities, and is also a member of the Petroleum Production Pioneers. Always an outdoor man, App finds relaxation in hunting and fishing, stock raising, and saddle horses; these latter activities centering around his ranch in Kern County. He is married, has three children and two grandchildren.

Bethlehem Announces Personnel Changes

Announcement was made on Jan. 2nd by H. H. Fuller, President of Bethlehem Pacific Coast Steel Corporation, of the appointment of Harvey Hewitt as Vice President in charge of sales for Bethlehem Pacific, replacing Paul W. Cotton, who is retiring. Mr. Fuller also announced the appointment of Wm. J. McClung as Vice President in charge of operations of all Bethlehem Pacific's steel plants and mill depots, succeeding T. S. Clingan who is also retiring.

Willard S. Briscoe has been appointed Manager of Publications in charge of the company's newly created Public Relations Department. F. A. W. Stiefler has been named Publications Representative for the Los Angeles District.

Succeeding Mr. Hewitt as Manager of Sales will be Lionel J. Soracco, formerly General Superintendent at the Los Angeles Plant. Mr. Soracco will in turn be succeeded by J. T. Rea, who has been in charge of new construction at that plant.

Mr. Hewitt, a long time resident of Pasadena and Covina, has been a steel sales executive in California for 23 years. At one time, he was Manager of Sales for the Bolt & Nut Division of the Pacific Coast Steel Company. He has for the past 14 years been Manager of Sales in the Los Angeles District for Bethlehem.

Mr. Soracco, formerly in export sales work with Pacific Coast Steel Company and at one time Manager of Sales for the Orient in Tokyo, has been General Superintendent of the Los Angeles Plant since 1925.

Mr. Rae had been previously employed at the Bethlehem, Pennsylvania plant of Bethlehem Steel Company since 1918, serving there as Combustion Engineer and later as Superintendent of Maintenance. For the past year, Mr. Rae has been in charge of new construction at the Los Angeles Plant.

Messrs. Hewitt, McClung and Briscoe will make their headquarters at the General Offices of the company in San Francisco.

International Exploration Corp. has been formed with a view to possible operations in California coastal areas, Canada and Mexico. Arthur C. Fisher is president, John H. Maurer, chairman of the board; and H. P. Dean, secretary-treasurer.

Calif. Oil Men on A.P.I. Committees

John E. Sherborne, Union Oil Co., has been elected national chairman of the 1947 Executive Committee of the A.P.I. Central Committee on Drilling & Production Practice. Among the members of this committee are T. H. Acres, Richfield Oil Corp., Paul Andrews, Signal Oil & Gas Co.; Carroll M. Beeson, Gen. Pet. Corp.; Lot Bowen, Western Gulf Oil Co.; and R. W. Marshall, Drilling & Exploration Co.

Sherborne and Bowen are also serving on the 1947 Program Committee. Bowen is also national chairman of the Topical Committee on Drilling Practice. Andrews is national vice chairman of the Topical Committee on Production Practice.

World production of petroleum in 1945 totaled more than 7½ million barrels daily, almost 1½ million barrels more than in the prewar year of 1941.

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Lloyd Again Heads Western Oil & Gas Association

Ralph B. Lloyd was reelected president of Western Oil and Gas Association, according to an announcement by the board of directors, following the annual meeting of the association, December 23, at the Ambassador hotel, Los Angeles. With his reelection Mr. Lloyd, president of Lloyd Corporation, Ltd., begins his sixth consecutive term.

Other officers elected by the association were William Reinhardt, first vice president (Union Pacific), H. D. Collier, second vice president (Standard), L. K. Whittier, treasurer (Belridge Oil Co.), Don E. Gilman, executive vice president, D. S. Kilgour, secretary, John M. Peirce, economist and George F. Prussing, technical secretary.

Twenty-seven members were reelected to the board of directors as C. R. Allen, (Continental) replaced retiring R. E. Collom, (Continental).

Board members reelected were: Leigh M. Battson, (Los Nietos Co.), C. S. Beesemyer, (General Petroleum), S. Belither, (Shell), James B. Black, (Pacific Gas and Electric), Harold L. Briggs, (Chanslor-Canfield Midway), H. D. Collier, (Standard), J. A. Crawford, (Youngstown Steel Products), S. J. Dickey, (General Petroleum), E. S. Dulin, (Byron Jackson), LeRoy M. Edwards, (Pacific Lighting Corp.), R. P. Huggins, (Western Gulf), Wm. F. Humphrey, (Tide Water Associated), C. A. Johnson, (Holly Development Company), C. S. Jones, (Richfield), W. M. Keck, (Superior Oil), Ralph B. Lloyd, (Lloyd Corporation), A. C. Mattei, (Honolulu Oil Corp.), S. B Mosher, (Signal), Wm. Reinhardt, (Union Pacific), L. P. St. Clair, (Independent Oil Producers' Agency), J. B. Sutherland, (The Ohio Oil Company), Reese H. Taylor, (Union), C. P. Watson, (Seaboard Oil Company), Torrey H. Webb, (The Texas Company), A. L. Weil, Higgins Building, W. C. Whaley, (Barnsdall Oil Company), L. K. Whittier, (Belridge Oil Company).

Founded in 1906, Western Oil and Gas Association is the oldest petroleum trade association in the west.

Field Development

PREPARED FROM CALIFORNIA OIL WORLD NEWS SERVICE

Los Angeles Basin

Irvine Test On Schedule

Almaria Industries Co., headed by Frank W. Hodgson, is rigging up to drill an exploratory project in Sec. 2-6s-8w near the town of Irvine in Orange County.

Pauley Locates West Newport Job

E. W. Pauley has location staked for McCain No. 7 in Sec. 17-6s-10w in the West Newport Beach field, Orange County. Signal Petroleum Co. of Calif. is about to give the finishing touches to its Deeble No. 2 at 3650 ft.

Alondra Area Wells Working

British-American Oil Producing Co., Bodger No. 2 in Sec. 22-3s-14w in the Alondra area is drilling at 6284 ft. Alondra Park No. 1, meanwhile, is plugging to test higher, after a formation test at 9100-9060 ft. was no good. Total depth is 9253 ft. Severns Drilling Co. is contractor on both jobs. Texas Co., Operator, Gardena Comm. No. 9-1 in Sec. 26-3s-14w in the Gardena area has been given up as a production failure at 10,085 ft.

Devils Canyon Well Progresses

Universal Consolidated Oil Co. is drilling its No. 1 wildcat test in Sec. 27-5n-17w in the Devils Canyon area of Los Angeles County at 2275 ft. Surface pipe is set at 495 ft.

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Whittier Try Written Off

With all sand gray to a depth of 1276 ft., Calumet Gold Mines Co. has given up its Delaney-Cinnabar No. 1 in Sec. 24-2s-11w in the Whittier area. Atlas Production Co. has spudded its Community No. 1-2 in Sec. 17-2s-11w.

Castaic Job Drills Ahead

In the Castaic area, Barnsdall Oil Co. is prospecting on down at 5373 ft. with Dodge No. 1 in Sec. 32-5n-16w. The company's Cipes No. 1 in Sec. 7-2s-11w at Montebello is drilling at 937 ft.

West Newport Job Squeezing

Amerada Petroleum Corp. is ready to squeeze its Anaheim Sugar No. 63-7 in Sec. 7-6s-10w in the West Newport area, after an ineffective water shut off at 5400 ft. Total depth is 5550 ft. Rig is up for No. 62-7 in the section. Irvine No. 75-7 in Sec. 7 has been relegated to history at 6560 ft.

El Segundo Try Located

Standard Oil Co., Operator, has staked location for Six Companies Fee No. 3 in Sec. 2-3s-15w in the El Segundo area. The project will search for new oil on the joint account of six oil concerns. Two previous tries in the area were disappointing, although one was a producer of little oil.

Chino Test Stands Idle

Idle at 4170 ft. portrays the present status of Grayco Oil Co., Mahla No. 1 in Sec. 13-3s-8w in the Chino area, San Bernardino County. C. W. Ginter & Associates, Kramer-Backs No. 3 in Sec. 33-2s-8w is still inactive at 3473 ft.

Corona Prospect Drilling Steady

Near Corona Del Mar in Orange County, Morton and Sons is drilling steadily ahead at 2110 ft. with Irvine No. 55-1 in block No. 55 on the Irvine subdivision.

Temecula Try Runs New String

Palomar Petroleum Co. is preparing to run new surface string inside the 12¾-in. set at 153 ft. in Tyrell No. 1 in Sec. 13-8s-11w in The Temecula area of Riverside County. The original string is apparently bad. Total depth is 713 ft.

East Coyote Job Grading

At East Coyote, ground is being graded for Union Oil Co.'s Hole No. 26. Severns Drilling Co. has the contract. Hathaway Co. has finished at 5174 ft. its Anaheim Union Water No. 23 for an initial yield of 165 barrels of oil daily.

Wilmington Adds Producer

Bankline Oil Co. continues to complete producing wells in the Wilmington field. Its U. P. No. 8 has been recompleted on the pump for 165 barrels of 2817 gravity oil daily from a depth of 5877 ft. U. P.

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Castaic Try Drilling On

Republic Operator, Inc., Fee No. 1 in Sec. 13-5n-17w in the Castaic area is drilling at 3553 ft. in its hunt for new oil. The area under interrogation has held the favorable regard of most geologists for more than 20 years. A new discovery at this location would occasion little surprise.

Los Angeles Test Cased

On formation test of the interval of 8365-8395 ft. in Richfield Oil Corp.'s U. P. Unit No. 3 in Sec. 16-2s-12w, clean oil in quantity was recovered, with the result casing has been set at 8280 ft. Total depth is 8405 ft.

Newhall Job Rigging Pump

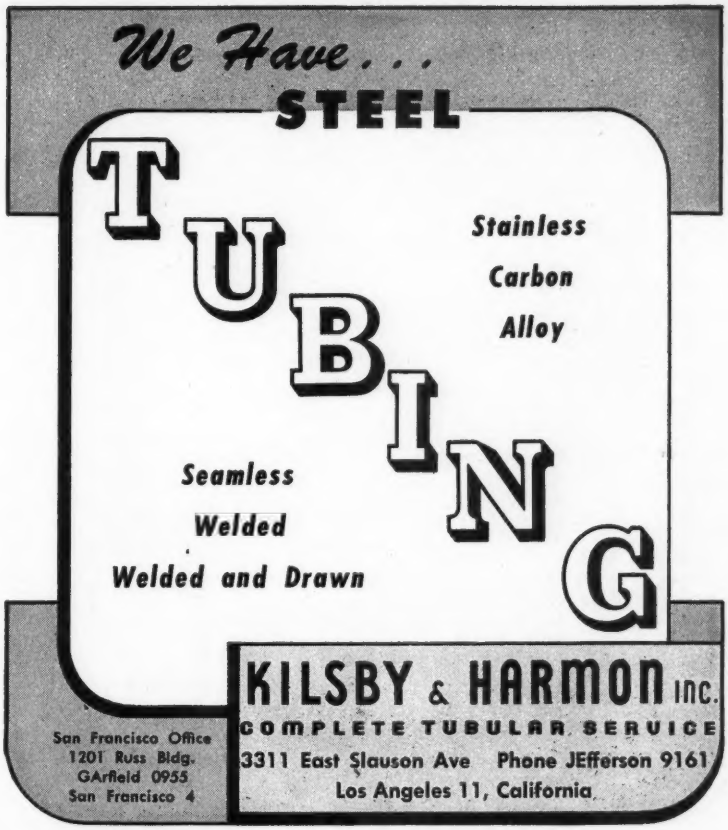
Pumping unit is in the course of installation on Seaboard Oil Co., Mission Land No. 8-1 in Sec. 25-3n-16w in the Newhall area. Total depth is 9528 ft., with plug at 7790 ft.

Standard Active Wildcat Operator

Standard Oil Co.'s current wildcat tests in Los Angeles Basin areas are at various stages of operation. Carmenita Community No. 1 in Sec. 4-3s-11w in the Santa Fe Springs area is spot coring at 11,326 ft. Newsom Community No. 1 in Sec. 36-2s-12w in the same area also is spot coring at 8145 ft. Stanley Community No. 1 in Sec. 33-4s-10w in the Garden Grove area, likewise, is spot coring at 8107 ft. Rig is up for Boobier No. 1 in Sec. 15-4n-17w in the Del Valle area. German Community No. 1 in Sec. 11-3s-11w in the Leffingwell area is still a location.

Oak Canyon Test Listed

Near the Oak Canyon field, Shell Oil Co., Inc., is ready to begin work on its U.S.L. No. 515-29 in Sec. 29-5n-17w in the Loma Verde district.



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Coastal and Northern District

Humboldt Well Drills On Down

Approximately 95 miles south of the California-Oregon line, Texas Co. is drilling at 6149 ft. with its Anderson No. 1 in Sec. 8-2n-1e near Hydesville, Humboldt County. In the Petrolia area, W. C. M. C. Oil Co., Inc, Mathew Clark No. 1 in Sec. 21-1s-2w has reached 1910 ft. Operations were suspended at that level.

Arroyo Grande Drill Program

The new Adams Oil Co. is ready to initiate a drilling program calling for 15 wells in the Arroyo Grande field in San Luis Obispo County. Heavy oil is obtained in the area between 1000 and 1400 ft.

Conejo Test In Prospect

Another test of the Conejo area in Ventura County is in prospect. David A. Barth has staked location for No. 4 in Sec. 32-2n-20w. In Sec. 33-2n-19w, Sandberg Petroleum Corp., Janss No. 1 in Sec. 33-2n-19w is idle at 5620 ft.

Madera Test Stands Idle

After a hunt to 3922 ft., Thomas M. Blake's Chuck No. 1 wildcat test in Sec. 28-10s-17e in the Madera area, Madera County, is standing idle, with the next move yet to be announced.

Sutter County Job Test Ready

Ready to test is Buttes Oilfields, Inc., Buttes No. 7 in Sec. 3-15n-1e in the Marysville Buttes area, Sutter County. Drilled to a total depth of 6371 ft., the well is plugged at 5584 ft. Some 584 ft. of liner was dropped. The 2-in. tubing is hung at 5000 ft.

Willows Test Stands Bridged

General Petroleum Corp., Llano Seco No. 1 in Sec. 33-20n-1w in the Willows area, Butte County, is standing bridged at 1550-625 ft. Total depth is 5456 ft.

Solano Try Suspended

In the Potrero Hills of Solano County, National Investors Fund, Inc., Burke Donohoe No. 1 in Sec. 12-4n-1w is idle at a depth of 2249 ft. What the future may hold for the project is yet to be determined.

Half Moon Bay Venture Quits

In the Half Moon Bay area in San Mateo County, not far from San Francisco, E. T. Willard's No. 3 in Sec. 15-6s-5w has been given up at 1300 ft.

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San Ardo Job Tests

C. C. M. O. Co. is testing its San Ardo No. 6-G1 in Sec. 6-23s-10e in the San Ardo area of Monterey County. Total depth is 8062 ft., with 646 ft. of liner, including 15 ft. of blank 7⅝-in., 234 ft. of blank 5½-in. and 397 ft. of 5 9/16-in. perforated landed on bottom and cp'd at 7642 ft. Texas Co.'s Aurignac No. 2A in Sec. 4-23s-10e is taking cores at 3165 ft.

Los Alamos Well Idle

Pumping off after pumping oil and mud, Whittier Associates' Barham No. 3 in Sec. 11-7n-32w in the Los Alamos area, Santa Barbara County last was reported idle at 6870 ft. The 11¾-in. pipe is cemented at 2833 ft., and the 8⅝-in., 5530 ft.

Fillmore Job Sited

Jahns Oil Co. has selected site for a new wildcat test near Fillmore. It will be known as Goodenough No. 1 and will go down in Sec. 18-4n-19w, Ventura County.

Torrey Canyon Wells Come In

Union Oil Co. has completed two new wells in the Torrey Canyon field. No. 65 is pumping 40 barrels a day from 1653 ft., and No. 66, 83 barrels from 1815 ft. No. 68 is drilling at 1725 ft. No. 69 is a location. The field was discovered by Union in 1896.

Cat Canyon Well Grades

In the Los Flores sector of the Cat Canyon field, Krieger Oil Co. is grading for its No. 1 in Sec. 22-9n-33w. The sector was a Standard Oil Co. discovery during 1938.

Hopper Canyon Job Hits Sand

Commander Oil Co., Ltd., No. 8F in Sec. 13-4n-19w in the Hopper Canyon field is making hole ahead in streaks of oil sand and hard sandstone. Ivy Drilling Co. is contractor.

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Santa Maria Wells Produce

Sunray Oil Corp., large Mid-Continent oil operator, but a comparative newcomer to California, has finished a new well on its Santa Maria Golf and Country Club lease in the Santa Maria Valley area. It was finished at 5588 ft. for 211 barrels. Sanders No. 4 also has been completed for 65 barrels from 4227 ft. Sunray has set casing at 4400 ft. in its Giacomini No. 5. Total depth is 4495 ft. Rig is up for Enos No. 3. Five C Refining Co. has made location for Nelson No. 4.

So. Mountain Well Pumping

Texas Co. went to a total depth of 4700 ft. with its S. P. No. 27 in the South Mountain area for a yield of 755 barrels of oil a day on the pump. Casing is set at 2200 ft.

Montalvo Test Reaches Depth

Standard Oil Co. has reached a depth of 10,687 ft. with its McGrath No. 2 wildcat test in Sec. 26-2n-23w in the Montalvo area, Ventura County, with drilling continuing ahead. In the Ojai area of the county, Fillmore Drilling Co. is pulling rods and tubing from its Ojai No. 1 in Sec. 12-4n-22w, which went to 2461 ft., before plugging back to 1610 ft. Honolulu Oil Corp., meantime, is redrilling at 2303 ft. with Signal-Bates No. 1 in Sec. 36-4n-25w in the Rincon area. Original bottom is 5560 ft. Near Santa Paula Creek, Oscar J. Smith, Anlauf No. 7 in Sec. 21-4n-21w is idle at 1453 ft.

In the Camarillo area, Texas Co. has abandoned at 3821 ft. its Broome No. 1, a prospect job in Sec. 29-1n-20w.

King City Try Works

Shell Oil Co., Inc., Honolulu-Thorup-USL No. 1, venturing for oil in the Kings City area of Monterey County was last reported trying to regain circulation with cement. Located in Sec. 4-20s-7e, the well is bottomed at 921 ft.

Gato Ridge Wells Drill

Magenheimer No. 541, sponsored by Standard Oil Co. in Sec. 9-9n-32w at Gato Ridge, is drilling at 3215 ft. Tognazzini No. 348 is grading drill site in Sec. 15-8n-32w.

The Gato Ridge area was first leased for oil well drilling in 1865. The lease was abandoned, however, without feeling the touch of the drill. The field was finally discovered in 1914.

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One patent, also two drawings of a three unit combination oil formation wall washers that will bring in clean oil wells from bottom of oil reservoir. Bert Travis, P. O. Box 796, Whittier, Calif. 1/5d & 1/20d

San Joaquin Valley

Deep Venture Recovers Pipe

Pacific Western Oil Corp. continues to cut and recover the drill pipe in its National Royalties No. 1, the world's deepest well, located in Sec. 5-26s-22e in the Miramonte area of Kern County. Pipe has been recovered to 12,479 ft., with the company washing over for another cut.

Ten Section Try Reaches 12,028 Ft.

In the Ten Section field of the San Joaquin Valley, Shell Oil Co., Inc., is conditioning mud for its KCL-A No. 53-30, with bottom of the hole at 12,028 ft. The project is designed as a complete and thorough test of the lower formations.

McKittrick Tests Keep Drilling On

Tide Water Associated Oil Co., Midway-McKittrick No. 5-32 in Sec. 32-30s-22e in wildcat ground near the McKittrick field is making hole ahead at 6404 ft. Wilshire Oil Co., Inc., meantime, is drilling at 6404 ft. with McKittrick No. 2 in Sec. 12-30s-21e.

Kettleman Try Has Pipe Stuck

Standard Oil Co.'s deep test of Kettleman Hills Middle Dome still has drill pipe stuck 11 ft. off bottom at 12,370 ft. Oil is being spotted. Casing is cemented in the project at 10,921 ft.

Bacon Hills Job Recovering Fish

Having recovered its fish, Seaboard Oil Co. is now cleaning out Seaboard-Bandini No. 3-21 in the Bacon Hills wildcat area in Sec. 21-28s-20e.

Cymric Field Adds Producer

Universal Consolidated Oil Co.'s Sauerdough No. 9 in Sec. 23-29s-21e in the Cymric field is completed and producing from the Point of Rocks zone. Initial flow was 106 barrels of 45 gravity clean oil a day, along with 1,840,000 cubic feet of gas. Total depth is 5340 ft. and casing is set at 5190 ft.

The company is moving in for Sauerdough No. 10, located about 50 ft. north of the new producer. It will be a twin well and is aimed and will end in the Oceanic oil sand zone. No. 9 tested the Oceanic zone for a substantial return, but it is not open to production at this location.

Race Track Hill Well Flowing Oil

Race Track Hill has rewarded General Petroleum Corp. with a producing well. It is Cooney No. 56-34 in Sec. 34-29s-29e, which came in flowing by heads 370 barrels of oil a day gross from an interval perforated between 4685 and 4690 ft.

Lost Hills Job Dormant

Richfield Oil Corp., Buck No. 1, a wildcat test in Sec. 6-27s-21e in the Lost Hills area is standing idle at a total depth of 2005 ft.

Arvin Well Going Deep

Western Gulf Oil Co.'s Di Giorgio No. 1 in Sec. 10-31s-29e in the Arvin area, which accounted for a discovery some weeks ago, is deepening at 6290 ft. in hard schist.

Indications are that a combination of interests made up of Union, Hancock and Independent Exploration may embark upon a concerted test through the medium of Richfield's abandoned Di Giorgio No. 3, which was drilled in 1945 to 5378 ft. Adjacent ground holder is Bolsa Chica Oil Corp.

Paloma Wildcat Fishing Collars

Western Gulf Oil Co.'s L.A.A.C. No. 16-6 extension test of the Paloma field in Sec. 6-32s-27e is fishing for drill collars. Depth is 12,028 feet in shale. General Petroleum Corp.'s Tupman No. 18-36 in Sec. 36-31s-26e is redrilling at 5663 ft.

Mountain View Well Swabbing

Pacific Western Oil Corp., Koehler No. 2 in Sec. 29-30s-29e in the Mountain View field swabbed to a depth of 4000 ft. showing no perceptible kick. The company is now cleaning out sand bridges at 5400 and 5472 ft. Total depth is 5563 ft. Mott No. 2 in Sec. 9-31s-29e is testing for production, after gun-perforating between 6790 and 6805 ft. Drilled to a bottom of 6813 ft., top Santa Margarita is placed at 6620 ft. Universal Consolidated Oil Co.'s Derby No. 1 in Sec. 15-31s-29e is fishing for liner, with bottom of hole at 6173 ft.

Tulare County Areas Scouted

Superior Oil Co. last was reported drilling at 3548 ft. with its Huntley No. 1 wildcat in Sec. 7-18s-24e in the Goshen area of Tulare County. In the Kingsburg area, Frakes Oil Co. is drilling at 1080 ft. in Toscan No. 1 in Sec. 28-16s-23e. Oil showings were reported from 1050 ft. on down to present bottom.

Cholame Test Finds No Oil

Buaas Development Co. has abandoned at 3400 ft. in basement material its No. 1 wildcat test on the Jack Ranch in Sec. 3-25s-16e in the Cholame area, San Luis Obispo County. Nothing of interest was reported.

San Emigdio Well Deepens

Rigging up to deepen marks present operations of Continental Oil Co. at its KCL No. L-I test in Sec. 11-11n-22w in the San Emigdio area. M. and T. No. 1 in Sec. 33-28s-29e at Round Mountain is an abandonment at 2745 ft.

Santos Creek Try Makes Hole

Approximately eight miles southwest of the Belridge field, Independent Exploration Co. is drilling at 985 ft. with Anderson No. 48 in Sec. 19-28s-20e near Santos Creek.

Round Mountain Explorer Coring

In the Round Mountain area of San Joaquin Valley, Independent Exploration is coring at 1502 ft. with its Olcese No. 1, a wildcat test in Sec. 21-28s-29e.

Belridge Try Now Runs Pipe

With bottom at 7996 ft., Richfield Oil Corp. is ready to run casing in its Berry No. 1 in Sec. 30-28s-21e in the South Belridge area. Belridge Oil Co.'s No. 62-W-33 in Sec. 33-28s-21e is swedging out 8⅝-in. casing at 3548 ft. Total depth is 13,975 ft.

Jasmine Job Runs Casing

Having topped oil sand at 2767 ft., Pacific Oil & Gas Development Corp. is preparing to run casing in its Cantleberry No. 73-22 in Sec. 22-25s-27e in the Jasmine area, Kern County. Total depth is 2784 ft. Harp & Brown has made location for Quinn No. 1 in Sec. 11-25s-27e.

Oildale Try Logs Oil Sand

K. R. Mar-Roo Syndicate, KCL No. 1 in Sec. 18-29s-29e in the Oildale area has run electric log to 2830 ft. About 30 ft. of oil sand was logged in the Chanac formation.

Edison Wildcat Rigging Derrick

West of the Edison field, Union Oil Co. is rigging derrick to start the drill in Porter No. 74-28 in Sec. 28-30s-29e. California Exploration Co. has spudded Porter No. 2 in Sec. 17. Pump is being rigged to Jergins Oil Co.'s Jergins-Texas No. 11 in Sec. 23. Bottom is 2700 ft. in schist. Rocket Petroleum Co. is grading ground for Oriole No. 1 in the section.

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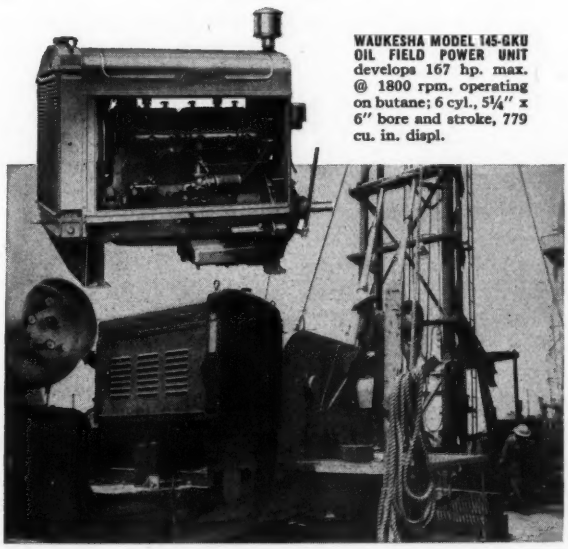

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Saudia Arabia

(Continued from Page 10)

suspected by geologists, and in the early 1930's King Ibn Saud asked American oil men to explore the country for petroleum. In 1933 the King granted a concession to the California Arabian Standard Oil Company, which later became the Arabian American Oil Company, and exploratory work began. The first well was drilled in 1935, but it was not until 1938 that the first successful well came in. Today oil derricks dot the landscape of the eastern coast of Saudi Arabia and four large fields have been discovered.

Arab workers have learned new skills, have proved both willing and nimble, They work hand in hand with American drillers. It takes about two years to train a first-rate Arab drilling crew, but the workers are industrious, loyal, and they get along well with their American partners.

Also, men who, a few years ago, knew only the life of the Bedu on the desert, now skillfully operate complicated oil refining equipment. American engineers and operators have trained their Arab co-workers well, and the Arabs have been good pupils.

Some Arab employes are of pure Bedu stock. Others come from the coastal cities near the Persian Gulf. Still others are those whose ancestors came to Arabia many years ago as African slaves.

The King is keenly aware of the tremendous importance of the oil development. He sees it as the greatest single means to modernize his country and improve the living standards of his people who, up to now, have had few opportunities for advancement.

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Montebello Field Well Rigging Pump

Having perforated at intervals between 2255 and 3715 ft. in its Barry No. 5 in Sec. 6-2s-11w in the Montebello field, Shell Oil Co., Inc., is rigging pump for test. The well went to a depth of 5350 ft., before plugging back to 5080 ft.

British-American Canada Officers Visit California Fields

The officers and managers of The British-American Oil Producing Company were hosts at a cocktail party on January 9th in the East Gold Room of the Ambassador Hotel to their many friends and to visiting Directors and Executives of The British-American Oil Company, Ltd., Toronto, Canada.

The Toronto men are visiting the company's main points of operation, such as the head office in Tulsa, Oklahoma; Oklahoma City, where they have been active since they drilled the Mary Green discovery of the North end of the field; Los Angeles, where recently the company, jointly with The Texas Company, completed the discovery well in the Gardena area, Bodger Well No. 1, and is presently engaged in the further development of their new strike.

Another stop was scheduled at Bakersfield, California, to look over the Race Track Hill Field, and then the party will proceed to Casper, Wyoming, to inspect the Pilot Butte Properties. This large and important field is entirely owned by British-American, and is one of the largest single reserves owned by the company.

It is felt that this visit will bring about an even closer tie between the two companies, as well as a broadening of the American Company's exploration operations over the next few years.

Directors and officers of the parent company have been gratified and pleased with the success of the American producing subsidiary during the past several years, and the purpose of this visit is to give directors and officers an opportunity of meeting with the officers and managers of the American properties, as well as the many friends of the company throughout the oil industry.

The visitors said that in Canada, during the past ten years, there has been a great expansion in the refining and marketing of petroleum products. Extensive exploration for crude oil has been carried on during this period, mostly in Western Canada, but these efforts have not been rewarded with the discovery of any important oil fields since Turner Valley, which was discovered in 1936. Gas and naphtha had been developed in Turner Valley many years before this date, but it was not known as a commercial oil field until the Brown Well was completed on the southern flank in 1936.

This oil field, important as it is in Western Canada, has never been able to do more than take care of a part of the petroleum requirements of the prairie provinces, leaving the rest of Canada dependent upon the importation of crude oil for its requirements.

As more than 70 per cent of the population and industrial development is located in Eastern Canada, it is easy to understand the important part the American Producing Company plays in the continued growth and development of the parent company as the leading independent Canadian distributor of petroleum products.

British-American products are now being marketed from coast to coast in Canada, as well as in Newfoundland. In addition, a promising export market for lubricating oils is being developed in other parts of the world.

Refinery expansion, which was entirely curtailed throughout the war years, now must go forward rapidly to keep pace with increased sales volume, and the company's plans call for a fifty per cent increase in refinery capacity over the next three to five years.

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No other country in the world has half the per capita consumption of petroleum of the U. S., and in most of the world it is on the order of 5 to 20 percent as much.

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